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IN THE UNITED STATES DISTRICT COURT  
FOR THE DISTRICT OF OREGON

**AUDUBON SOCIETY OF PORTLAND,  
WILDLIFE DEFENSE FUND, CENTER  
FOR BIOLOGICAL DIVERSITY, FRIENDS  
OF ANIMALS,**

Plaintiffs,

v.

**U.S. ARMY CORPS OF ENGINEERS, U.S.  
FISH AND WILDLIFE SERVICE, USDA  
WILDLIFE SERVICES,**

Defendants.

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No. 3:15-cv-665-SI

**DECLARATION OF RITCHIE J. GRAVES**

I, Ritchie Graves, declare and state as follows:

1. I currently serve as Chief of the Columbia Hydropower Branch for the National Marine Fisheries Service's (NMFS) West Coast Region (Interior Columbia Basin Area Office), which includes the states of Oregon, Washington, California, Idaho and Montana. I have been in this position since October, 2013. Previously, from April 2006 until September 2013, I was Chief of the Federal Columbia River Power System (FCRPS) Branch for NMFS' Northwest Region Hydropower Division. I have been employed by NMFS as a fishery biologist, working on the impacts of hydropower projects on salmon and steelhead, since 1993. My current responsibilities include managing FCRPS branch staff, participating as NMFS' senior technical staff in NMFS' regional forum process and related Corps of Engineers' work groups, and developing information and recommendations relating to fish passage, water quality, and related facilities and operations at FCRPS dams.

2. I earned an M.A. in Zoology (Aquatic Ecology Emphasis) from the University of Montana in 1993. My masters research concerned the structure and dynamics of crayfish populations within Noxon Rapids Reservoir, Clark Fork River, Montana. I received a B.S. in biology from Centre College of Kentucky in 1989.

3. Since April, 2006, as Chief of NMFS' Columbia Hydropower Branch (formerly the FCRPS Branch), my principal responsibilities, as they relate to the 2008 Biological Opinion (2008 Supplemental Comprehensive Analysis, and 2010 and 2014 supplemental biological opinions) on Operation of the Federal Columbia River Power System, including the 11 Bureau of Reclamation Projects in the Columbia Basin (hereafter '2008 BiOp,' '2008 SCA,' '2010 Supplemental BiOp,' and '2014 Supplemental BiOp'), was to manage FCRPS staff in 1) collecting and analyzing relevant data, 2) developing and using the COMPASS model 3) drafting portions of the draft and final biological opinion and supplemental comprehensive analysis (and appendices), 4) managing staff that participate in regional forums to implement hydro and predation actions, and 5) tracking hydro and predation action effectiveness. Since October 2013, I also serve as the NMFS West Coast Region's policy representative concerning

fish protection programs for the five public utility district dams on the middle reach of the Columbia River (Priest Rapids, Wanapum, Rock Island, Rocky Reach, and Wells dams, hereafter “Mid-Columbia PUD dams”) between the FCRPS’ McNary and Chief Joseph dams that are licensed by Federal Energy Regulatory Commission (FERC).

4. As a NMFS staff biologist (1997 to 2006) specializing in hydroelectric and storage projects, I have gained substantial experience assessing the effects of mainstem hydroelectric projects and developing actions to reduce or mitigate these impacts. In particular I have served as NMFS’ technical lead on the relicensing of the FERC-licensed Hells Canyon Complex hydroelectric project (since 1997) and in the development and implementation Anadromous Fish Agreements and Habitat Conservation Plans for three of the Mid-Columbia PUD dams (2001 to 2005).

5. Prior to working in NMFS’ Portland Office (beginning in March, 1997), I worked in NMFS’ Smolt Monitoring Program at John Day Dam (1993-1997), primarily as the project biologist, supervising up to eight biological technicians and contractors. In this capacity, I was responsible for 1) collecting information on the number and condition (descaling, injury, etc.) of juvenile salmon and steelhead, and transmitting this information, along with dam operations information, to the Fish Passage Center, and 2) for preparing annual reports of this work. As a result of this work, over four field seasons, I personally evaluated 10s of thousands of individual Chinook, coho, and sockeye salmon and steelhead smolts for signs of injury – either from predators or other sources.

6. In the summer of 1992, I was employed by the Montana Department of Fish, Wildlife, and Parks as a fisheries fieldworker. This work involved collecting information to assess the losses of juvenile trout to irrigation diversions, estimating population structure and abundance of trout populations in tributaries of the Bitterroot River, and monitoring standard habitat metrics to assess changes to and quality of aquatic habitat in these same tributaries.

7. In preparation for this declaration, I have reviewed 1) NMFS’ 2008 Supplemental Comprehensive Analysis (2008 SCA), 2008 BiOp, 2010 Supplemental BiOp, and 2014

Supplemental BiOp and supporting materials for these documents; 2) the related declarations filed on behalf of the plaintiffs by Ms. Linda Wires (and six other Declarants); and 3) scientific literature cited by Ms. Wires and the other Declarants; and 4) other pertinent documents in NMFS or the Action Agencies' administrative records.

8. This declaration includes information provided and analyses prepared by Mr. Gary Fredricks of my staff. The purpose of this declaration is to address technical issues raised by Ms. Wires (Declaration ¶6) concerning claims relating to NMFS' analysis in the aforementioned FCRPS biological opinions relating to assessing the effects of predation by double-crested cormorants the East Sand Island on salmon and steelhead smolts migrating through the Columbia River estuary, and the likely efficacy of proposed actions to reduce these effects. This declaration also provides additional information about current rates of predation on salmonids by double-crested cormorants in the estuary.

9. The most recent studies demonstrate the double-crested cormorants are consuming about 16 to 20 million smolts annually (Roby, 2014). NMFS estimates that at least 2 million of these are ESA-listed smolts. Absent action by the Corps, there is no evidence to suggest that these figures will be any lower this year or in the coming years.

10. Ms. Wires (Declaration ¶6) first asserts that NMFS' analysis was not peer-reviewed. Analyses done to support a biological opinion's Reasonable and Prudent Alternative (RPA) are not normally "peer-reviewed" in the same sense as journal papers, and there is no legal requirement to do so. However, with respect to the 2014 Supplemental FCRPS BiOp, NMFS staff did seek and receive reviews of its double-crested cormorant analysis by a variety of scientists both inside and outside NMFS. Specifically, the approach taken by NMFS was reviewed and supported by NMFS Hydro staff biologists and by scientists from outside the agency through the BiOp review process, including scientists in the Corps of Engineers, Real-time Research and Oregon State University as well as reviewers from the states of Oregon, Idaho, Washington and the Columbia River Intertribal Fish Commission. Ms. Wires' assertion is, therefore, incorrect.

11. Ms. Wires (Declaration ¶6) claims that NMFS' survival gap analysis is not scientifically rigorous. I disagree. NMFS staff used the best available data regarding past and present (1) abundance of double-crested cormorants, (2) consumption of juvenile salmonids by double-crested cormorants, and (3) estimates of juvenile salmonid populations in the Columbia River Estuary to estimate the rate of cormorant consumption on juvenile steelhead, spring and fall Chinook salmon. These data sources are cited in the analysis under Appendix E of the 2014 Supplemental FCRPS BiOp. Specifically, all the data regarding cormorant populations and salmonid consumption rates in the Columbia River Estuary was provided by Real-time Research (Collis et al, various dates), Oregon State University (Roby et al, various dates), other peer reviewed sources (e.g., Carter et al. 1995) and the smolt population data were provided by the NOAA Northwest Fisheries Science Center (see 2014 Supplemental BiOp, Appendix E). This information is the best scientific information available regarding the abundance of double-crested cormorants, the abundance of juvenile salmonids, and the estimated consumption of juvenile salmonids by double-crested cormorants in the Columbia River estuary. Ms. Wires (and other Declarants) do not provide any evidence to the contrary.

12. Ms. Wires (Declaration P6) next claims that the sole reason of the action is to increase the number of adult salmon and steelhead. I agree with Ms. Wires, in the sense that NMFS' goal is to reduce morality factors of salmon and steelhead in each life-stage, which will ultimately result in higher population productivity, and increased adult returns – which is necessary to recover these species. The purpose of the 2014 Supplemental FCRPS BiOp (Appendix E) analysis was simply to determine the difference in double-crested cormorant consumption of juvenile listed salmonids in the lower Columbia River Estuary between the base and the current periods used in the 2008 FCRPS BiOp analysis. This analysis allowed NMFS to determine how the dramatic increase in estuary double-crested cormorants would affect the interpretation of the original baseline analysis. The resultant difference was an estimated survival gap of 3.6 percent for migrating steelhead smolts (total impact of about 6.5%), which were the most affected stock of listed salmonid consumed (2014 Supplemental FCRPS BiOp, Appendix

E). After determining the survival difference, it was logical to carry the analysis farther to determine the number of cormorants needed in the estuary to achieve the base period average smolt consumption level. This level was used as a goal in the 2014 Supplemental FCRPS BiOp and the Corps' double-crested cormorant management plan.

13. Ms. Wires (Declaration ¶6) asserts that NMFS "has not seriously evaluated" compensatory mortality in the context of double-crested cormorants at East Sand Island; that smolts consumed by cormorants "may be less fit" than fish that are not consumed; and that the assumption "that a reduction in cormorant numbers will result in an equal increase in smolts surviving to adulthood is naïve." Ms. Wires' statements are unsubstantiated and erroneous.

14. First, the issue of compensatory predation mortality was thoroughly considered in the 2014 Supplemental FCRPS BiOp (see Sections 2.2.4.1 and 3.5.2, and Response to Comments). NMFS could find no reliable, substantiated estimates of compensatory mortality, in relation to estimated double-crested cormorant predation on salmon and steelhead smolts in the Columbia River estuary. Ms. Wires is unable to provide a viable estimate of compensatory mortality, because "the degree to which avian predation on juvenile salmon in the Columbia River basin is additive versus compensatory is currently unknown" (Lyons et. al. 2011).

15. The idea of compensatory predation mortality would argue that at least some portion of the smolts consumed by double-crested cormorants (especially those individuals that are less fit) would have died from other factors subsequent to the predation event. NMFS clearly recognized that 1) most juvenile salmon that enter the ocean perish before returning to the Columbia River (see 2014 Supplemental FCRPS BiOp discussion of Smolt to Adult return rates – Section 2.1.1.6.4 and Sections 3.3.3.4 and 3.3.3.5) and 2) there is evidence that fish condition, size, and rearing history in upstream river reaches within the dams of the hydropower system may affect the vulnerability of fish to double-crested cormorant predation (Hostetter et al, 2012).

16. There are no similar vulnerability studies for the estuary cormorant colony, which is approximately 200 river kilometers below the last mainstem hydropower project and the

transport release sites.<sup>1</sup> Since cormorants in the estuary are active predators rather than scavengers, and fewer than 2% of the unclipped (wild) and 4% of the clipped (hatchery) steelhead smolts are estimated to be descaled (a sign of significant injury) at the Bonneville Dam smolt monitoring facility (Martinson et al, 2015)<sup>2</sup>, it is NMFS' assumption that fish in the lower estuary that are taken by these predators are alive, have survived many challenges to get to the estuary, and are considered to be viable by NMFS at the time they are taken (within miles of the Pacific Ocean).

17. Finally, Ms. Wires (Declaration ¶6) asserts that the Corps of Engineers' (and by extension, NMFS') idea "that compensatory mortality is not an important consideration - that reducing the cormorant population to "base period" levels is the key goal of the Corps' management plan – is scientifically indefensible." Again, I disagree. Clearly, the available information relating to double-crested cormorant predation in the Columbia River estuary and the potential for compensatory mortality was reviewed and considered by NMFS (and the cooperating agencies that developed the Environmental Impact Statement that is the subject of this proceeding).

18. This argument is not, however, central to the treatment of double-crested cormorant predation in the 2014 Supplemental FCRPS BiOp, which primarily focused on the abundance of the double-crested cormorant population in the lower Columbia River Estuary, which plaintiffs agree, increased dramatically between the Base and Current periods considered

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<sup>1</sup> Dead fish released below Bonneville Dam (a requirement of the Corps of Engineers' acoustic tag study design protocols) are consistently consumed before reaching the "exit" point of the study area. Skalski et al. (2012) explains that "the location for the detection array at rkm 161 was chosen so that there was little or no chance of detecting fish that died during dam passage and floated downriver with still active tags." Thus, all the dead fish in the vicinity of the Bonneville dam (rkm 234) and presumably, those that are seriously injured and most likely to contribute to theoretical compensatory mortality – are effectively removed within 73 km (45 miles) of the dam.

<sup>2</sup> John Day and Bonneville Dams – 2014 Smolt Monitoring Data Summaries are reported annually by Smolt Monitoring Program personnel working for the Pacific States Marine Fisheries Commission.

by the original 2008 FCRPS BiOp analysis. There is certainly no evidence that compensatory mortality has changed between the Base and Current periods, therefore, NMFS' assumption that the juvenile salmonids are equally vulnerable in either time period is valid. Neither Ms. Wires nor the other Declarants offer any argument to the contrary. The ultimate difference between these two periods is still the difference in the effect of the increased abundance of cormorants and their average rates of consumption for populations of listed salmon.

19. As an example, for steelhead, assuming a compensation level of 50%, would result in a difference that is one-half of the calculated 3.6% in the 2014 Supplemental BiOp analysis (see Appendix E), or 1.8%. However, the number of cormorants that would need to be removed to return predation levels back to the base period consumption rate – assuming no change in compensatory mortality between the two periods - would still be between 5,380 and 5,939 pairs.

I declare under penalty of perjury that the foregoing is true and correct. Executed on May 6, 2015, in Portland, Oregon.

A handwritten signature in blue ink, reading "Ritchie J. Graves", is written over a horizontal line.

Ritchie J. Graves, Chief  
Columbia Hydropower Branch  
Interior Columbia Basin Office  
NOAA Fisheries, West Coast Region